

## IN- HOSPITAL RESULTS AND COMPLICATIONS OF AD HOC IN COMPARISON WITH ELECTIVE PERCUTANEOUS CORONARY INTERVENTIONS IN BASRA GOVERNORATE

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### ABSTRACT

**Background:** Ad hoc percutaneous coronary intervention (PCI) has proven to be safe in certain cases of coronary artery disease patients, and the number of this type of procedure has increased steadily over the years. We performed a study to compare the in-hospital results and complications of Ad hoc Vs elective PCI.

**Aim:** To compare in-hospital results and complications of Ad hoc Vs elective PCI.

**Methods:** From January 2013 to November 2014, 349 consecutive patients undergone percutaneous coronary intervention in Basra Cardiac Center were included in our study, of these patients, 129 were submitted to Ad hoc PCI and 220 to elective PCI. Primary PCI (an emergency percutaneous coronary intervention in the setting of ST elevation myocardial infarction without prior fibrinolytic therapy) and Rescue PCI (percutaneous coronary intervention after failure of fibrinolytic therapy) were excluded from the study.

**Results:** The Ad hoc PCI group was younger, had a lower prevalence of coronary artery disease risk factors and a larger numbers of patients were treated in the presence of unstable angina and myocardial infarction. The Ad hoc PCI group was on average three years younger than elective PCI group ( $55.78 \pm 9.599$  years Vs  $58.55 \pm 9.661$  years) and had lower prevalence of coronary artery disease risk factors except cigarette smoking and obesity (24.6% Vs 20.4% and 12.4% Vs 10% respectively), lower prevalence of renal impairment (1.5% Vs 3.1%), large number of patients had unstable angina and myocardial infarction (25.5% Vs 11.3% and 21.7% Vs 10.4% respectively). The elective PCI group had stents were of larger (3.0 mm) diameter (38.6% Vs 31%), but both groups had approximately equal stent diameter. The incidence of in - hospital myocardial infarction was more in Elective PCI group (1.36% Vs 0.7%), there was no significant difference in incidence of major vascular complications in both groups (0.7% Vs 0.9%), there was on incidence of death or coronary artery bypass grafting in both groups. Procedural success was similar between two groups (96.9% Vs 92.72%---P value = 0.168).

**Conclusions:** Ad hoc PCI procedure is of comparable procedural success rate with less complication in comparison with elective PCI, so it is a safe procedure for the most selected patients.

**KEYWORDS:** Ad Hoc PCI, Elective PCI, Percutaneous Coronary Intervention

### INTRODUCTION

Percutaneous coronary intervention (PCI) is used for the treatment of coronary artery disease (CAD), it is the preferred method of revascularization for the majority of patients with coronary artery disease in the United States in the

absence of left main or complex multivessel coronary artery disease.(1) The use of percutaneous coronary intervention is increasing. (2) The literal translation of the word Ad hoc is "for this" or "for this purpose", and in the field of interventional cardiology, it means that performance of percutaneous coronary intervention immediately after diagnostic coronary angiography in the same day (one session).(3,4) Worldwide, over the last two decades, there has been a significant increase in the number of Ad hoc percutaneous coronary interventions.(3,5)

It is reported that during a 10-years period (1990-2000), there was a significant increase in use of Ad hoc percutaneous coronary interventions from 54%-88% with less significant complications rate.(5) These results were similar to those reported in State of New York registry, where 80% of percutaneous coronary interventions were Ad hoc. (6)

Ad hoc percutaneous coronary intervention procedure is safe in comparison with elective one in selective cases, and the patients feel comfortable because it is one procedure (while in elective PCI, there are two procedures, the first is diagnostic and the other is therapeutic which is done later on (two sessions), and this will reduce the rate of vascular complications at the puncture site of catheterization.(7-9) On the other hand, there are some disadvantages of Ad hoc PCI including the use of large volume of contrast media with subsequent possible increase in development of contrast –induced nephropathy, exposure to high radiation dose, increased time of procedure and pressure for faster decision sometimes is not reasonable as compared to decision taken by a "team work".(7-9)

## AIM

To compare the in-hospital results and complications of Ad hoc Vs Elective percutaneous coronary interventions.

## PATIENTS AND METHODS

From January 2013 to November 2014, 349 consecutive patients undergone percutaneous coronary intervention in Basra Cardiac Center were included in our study, of these patients, 129 were submitted to Ad hoc PCI and 220 to elective PCI. Primary PCI (an emergency percutaneous coronary intervention in the setting of ST elevation myocardial infarction without prior fibrinolytic therapy) and Rescue PCI (percutaneous coronary intervention after failure of fibrinolytic therapy) were excluded from the study. (10) Data were collected prospectively. Most cases of percutaneous coronary interventions were performed via femoral artery approach and the others via radial artery approach. All cases were pretreated with dual antiplatelet therapy (Acetylsalicylic Acid and Clopedogril) and unfractionated Heparin was used at the beginning of procedures. The femoral sheaths were removed four hours after the start of heparinization while the radial sheaths were removed immediately after the procedure. The

Thrombolysis in Myocardial Infarction (TIMI) classification was used to determine the degree of coronary flow before and after PCI procedure { Grade 0 (no perfusion), Grade 1 (penetration with minimal artery perfusion) Grade 2 (partial reperfusion) Grade 3 (complete reperfusion) }. (11) The procedural success of PCI was defined as the achievement of angiographic success (residual stenosis less than 20% with TIMI 3 flow) with the absence of major cardiac or cerebrovascular events (including death, myocardial infarction, stroke or emergency coronary artery bypass graft surgery) during hospitalization.(12) Data were analyzed by using SPSS.

## RESULTS

Table 1 shows the clinical characteristics of study population, the Ad hoc PCI group was on average three years younger than elective PCI group ( $55.78 \pm 9.599$  years Vs  $58.55 \pm 9.661$  years) and had lower prevalence of coronary artery

disease risk factors except cigarette smoking and obesity (24.6% Vs 20.4% and 12.4% Vs 10% respectively). The Ad hoc PCI group has lower prevalence of renal impairment (1.5% Vs 3.1%). With regard to clinical presentation, large number of patients in Ad hoc PCI group had unstable angina and myocardial infarction (25.5% Vs 11.3% and 21.7% Vs 10.4% respectively) as shown in table 3. In both groups, the left anterior descending artery was the mostly treated vessel (58.9% Vs 50.9%). LV systolic dysfunction was more frequently seen in elective Vs Ad hoc PCI group (22.7 % Vs 20.1%). Regarding stent diameter, as shown in table 5, the elective PCI group had stents were of larger diameter (3.0 mm) in comparison with Ad hoc PCI group (38.6% Vs 31%), but both groups had approximately equal stent diameter as shown in table 6. Regarding hospital complications (table 7), the incidence of myocardial infarction was more in Elective than Ad hoc PCI group (1.36% Vs 0.7%), there was no significant difference in incidence of major vascular complications in Ad hoc PCI group in comparison with elective PCI group (0.7% Vs 0.9%), there was no incidence of death or coronary artery bypass grafting in both groups. Procedural success was similar between two groups (96.9% Vs 92.72% ---P value = 0.168).

## **DISCUSSIONS**

In our study, Ad hoc PCI procedures account for more than half of the total PCIs. Most patients undergoing Ad hoc PCI had unstable angina and myocardial infarction as compared with elective PCI group who predominantly had stable angina. Patients undergoing elective PCI were older and had high prevalence of hypertension, hyperlipidemia, diabetes and renal impairment, while cigarette smoking and obesity were more prevalent in Ad hoc PCI group. These findings are somewhat similar to what is reported by Goldstein et al registry which showed that patients undergoing Ad hoc PCI were less likely to have diabetes, renal impairment in comparison with elective PCI group. (9) In our study, there were no significant differences between two groups with regard to hospital complications apart from myocardial infarction which was higher in elective PCI group. In Goldstein et al registry, there were no significant differences in mortality for Ad hoc and elective PCI groups (OR 1.14, P=0.38 for Ad hoc Vs elective PCI groups), and Ad hoc PCI group appears to have mortality as low as elective PCI group. (9) In the American College of Cardiology-National Cardiovascular Data Registry (ACC-NCDR) which was performed between 2001 and 2003, showed no differences between Ad hoc Vs elective PCI groups for occurrence of renal failure, vascular complications, or death during hospitalization. (13) In another study of the New

York registry, Hannan et al. assessed 46,565 PCIs that were performed in the period between 2003 and 2005, and found no differences with regard to hospital mortality between the Ad hoc and elective PCI groups. <sup>(6)</sup>

## **STUDY LIMITATIONS**

The limitations of our study include that the study was performed in a single center (although –Basra Cardiac Center is the only cardiac center performing PCI procedures in the governorate), and absence of late follow-up.

## **CONCLUSIONS**

Ad hoc PCI procedure is of comparable procedural success rate with less complications in comparison with elective PCI, so it is a safe procedure for the most selected patients.

**Table 1: Characteristics of the Study Population**

		Elective		Ad hoc	
		Number	Percent	Number	Percent
Age	25-35 years	3	1.4	0	0
	36-56 years	89	40.5	66	51.2
	57-77 years	125	56.8	61	47.3
	More than 77 years	3	1.4	2	1.6
	Total	220	100	129	100
Sex	Male	172	78.2	100	77.5
	Female	48	21.8	29	22.5
	<b>Total</b>	<b>220</b>	<b>100</b>	<b>129</b>	<b>100</b>

Mean age and SD	58.55±9.661	55.78±9.599
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**Table 2: Coronary Artery Disease Risk Factors**

	Elective		Ad hoc		Total
	Number	Percent	Number	Percent	
Hypertension	140	63.64	66	51.16	206
Diabetes	67	30.45	38	29.46	105
Smoking	45	20.45	55	24.63	100
Family history	13	5.90	7	5.4	20
Hyperlipidemia	83	37.98	33	25.45	116
Obesity	22	10.00	16	12.40	38
Renal impairment	7	3.1	2	1.5	9
No risk factor	17	7.73	10	7.75	27

**Table 3: Clinical Presentation**

	Elective		Ad hoc		Total
	Number	Percent	Number	Percent	
Asymptomatic	52	23.63	21	16.27	73
Angina equivalent	40	18.18	24	18.60	64
Stable Angina	80	36.36	23	17.82	103
U A	25	11.36	33	25.58	58
M I	23	10.45	28	21.70	51
<b>Total</b>	<b>220</b>	<b>100</b>	<b>129</b>	<b>100</b>	<b>349</b>

UA; unstable Angina. MI; Myocardial Infarction

**Table 4: Angiographic Characteristics**

	Elective		Ad Hoc	
	Number	Percent	Number	Percent
LAD	112	50.9	76	58.9
RCA	64	29.1	34	26.4
LCX	44	20.0	19	14.7
LV dysfunction	50	22.7	26	20.1

**Table 5: Stent Diameter**

	Elective		Ad hoc	
	Number	Percent	Number	Percent
2.25	38	17.3	13	10.1
2.50	50	22.72	32	24.8
2.75	28	12.72	33	25.6
3.00	85	38.63	40	31.0
≥3.5	19	8.63	11	8.5
<b>Total</b>	<b>220</b>	<b>100</b>	<b>129</b>	<b>100</b>

**Table 6: Stent Length**

	Elective		Ad hoc	
	Number	Percent	Number	Percent
8-15 mm	61	27.7	38	29.5
16-23 mm	99	45.0	63	48.8
24-31 mm	44	20.0	22	17.0
32-40 mm	16	7.3	6	4.7
<b>Total</b>	<b>220</b>	<b>100</b>	<b>129</b>	<b>100</b>

**Table 7: Hospital Complications**

	Ad hoc		Elective	
	Number	Percent	Number	Percent
Myocardial infarction	1	0.7	3	1.36
CABG	0	0	0	0
Death	0	0	0	0
Major vascular complication	1	0.7	2	0.9

CABG: Coronary Artery Bypass Grafting

\*P value cannot be computed because of small numbers in the cells.

**Table 8: Procedural Characteristics**

	Ad hoc		Elective		P Value
	Number	Percent	Number	Percent	
Success	125	96.90	204	92.72	0.168
Failure	4	3.10	16	7.28	
<b>Total</b>	<b>129</b>	<b>100</b>	<b>220</b>	<b>100</b>	

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دراسة النتائج والمضاعفات داخل المستشفى للقسطرة العلاجية المزدوجة مقارنة بالقسطرة العلاجية المرحلية في محافظة البصرة

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المقدمة: اجراء عملية التداخل القسطاري لعلاج انسداد الشرايين التاجية ازداد خلال السنين الماضية. حيث يعتبر التداخل القسطاري الطريقة المفضلة للعلاج لاجل المرضى في الولايات المتحدة الامريكية في حالة عدم وجود ضيق الجذع الايسر او التضيق الشريانية التاجية المعقدة والمتعددة. اثبتت كثير من الدراسات ان القسطرة العلاجية المزدوجة آمنة في كثير من حالات تصلب الشرايين التاجية وان استعمال هذا النوع من التداخل القسطاري ازداد بشكل مضطرد خلال الفترة الماضية.

الهدف: مقارنة النتائج والمضاعفات داخل المستشفى للقسطرة العلاجية المزدوجة في مقابل القسطرة العلاجية المرحلية.

طرق العمل: العدد الكلي للمرضى المشمولين في هذه الدراسة هو 349 مريض للفترة من كانون الثاني 2013 الى تشرين الثاني 2014. تم اجراء العمليات في مركز البصرة للقلب. حيث يعتبر هو المركز الوحيد لاجراء القسطرة العلاجية في محافظة البصرة. المشمولين بالقسطرة العلاجية المزدوجة كان عددهم 129 مريض اما المشمولين بالقسطرة العلاجية المرحلية فكان 220 مريض. تم ادخال البيانات بشكل تتبعي, اغلب الحالات تم اجرائها عن طريق الشريان الفخذي

والبقية عن طريق الشريان الكعبري.

النتائج: المرضى الذين اجريت لهم عملية قسطرة علاجية مزدوجة كانوا اصغر سنا وكان لديهم اقل عوامل خطورة من الذين اجريت لهم عملية قسطرة علاجية مرحلية. بينما كانت نسبة الذبحة الصدرية الغير مستقرة واحتشاء العضلة القلبية اكبر عند مرضى القسطرة المزدوجة. قطر الدعامات المستعملة كان اكبر عند مرضى القسطرة المرحلية, ولكن كان طول الدعامات متساو في كلا المجموعتين. بالنسبة للمضاعفات داخل المستشفى, كان احتشاء العضلة القلبية اكثر عند مرضى القسطرة المرحلية, ولا توجد حالات وفيات ولا عمليات ترقيع الشرايين بشكل طارئ لكلا المجموعتين. نسب نجاح عمليات القسطرة العلاجية كانت متقاربة في كلا المجموعتين.

الاستنتاج: اجراء عملية القسطرة العلاجية المزدوجة لكثير من مرضى انسداد الشرايين التاجية يعتبر آمن وان نسبة المضاعفات داخل المستشفى اقل من القسطرة العلاجية المرحلية ونسبة النجاح متقاربة مقارنة مع القسطرة العلاجية المرحلية.

